

**NEOTROPICAL MICROLEPIDOPTERA XXV, A NEW  
ARBOREAL SPECIES OF *ACROLOPHUS* FROM  
PERU (LEPIDOPTERA: ACROLOPHIDAE)**

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*Abstract.*—A new species, *Acrolophus arboreus*, of the endemic American family Acrolophidae is described from the upper Amazon of Peru. Similar larval material from Manaus, Brazil, suggests the species to be widespread through the Amazon Basin. The larvae are arboreal and construct elongate tubes of silk and wood fragments on the bark of several unrelated tree species. The larvae are believed to be scavengers on lichens and similar plant material.

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Little is known about the larval biology for the approximately 265 described species of the endemic American moth family Acrolophidae. Consequently, one can only speculate as to how diverse their life histories might be (Davis et al., 1986; Davis, 1987; Davis and Milstrey, 1988; Davis, 1990). It is generally believed that acrolophid larvae develop predominantly within a terrestrial habitat. The larvae of *Acrolophus*, for example, typically construct long silken, subterranean tubes amongst plant debris and roots upon which they feed (Hasbrouck, 1964). The few published records of arboreal *Acrolophus* refer to species living in the root system of epiphytic bromeliads (Picado, 1913; Beutelspacher, 1969).

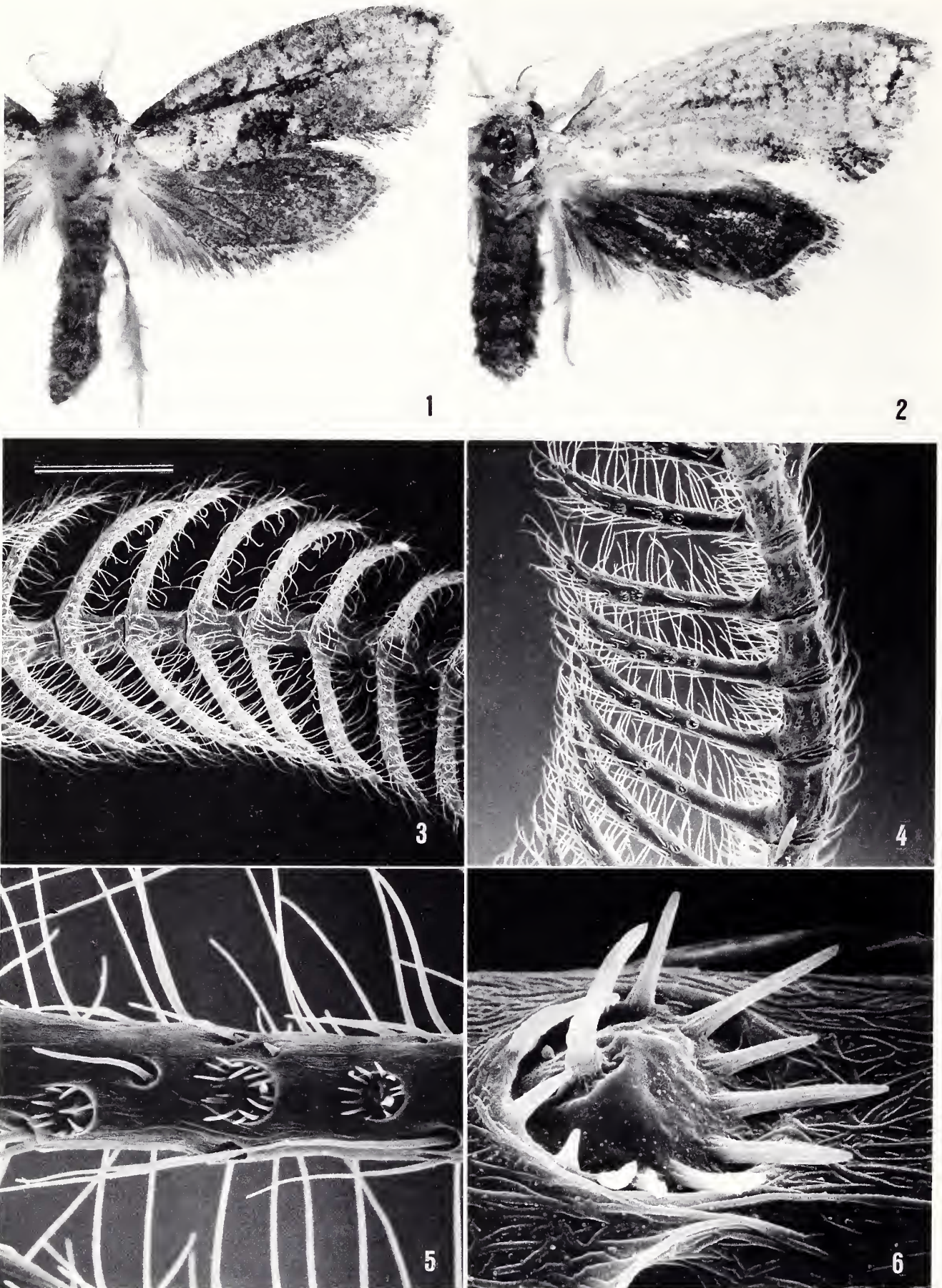
Field work over the past decade by the junior author (Hogue) has resulted in the discovery of an even “more arboreal” *Acrolophus*, whose larvae are believed to be scavengers on plant material growing on the bark of certain trees. A second arboreal and undescribed *Acrolophus* has also been observed in Costa Rica (D. Janzen, pers. comm.). A description of the Peruvian species is provided below.

Deposition of specimens referred to in this paper are: LACM for the Los Angeles County Museum of Natural History, Los Angeles, California and USNM for the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Abbreviations of morphological terms used for larval description defined in Davis, 1987.

***Acrolophus arboreus*, new species**

**ADULT** (Figs. 1, 2). Length of forewing: ♀ 12–13 mm; ♂, 12 mm. Moderately large moth with uniformly fuscous hindwings and variably marked dark fuscous to light brown forewings which are paler in the female. Labial palpi elongate in male, curving, over head to metanotum; much shorter and porrect in female.

*Head:* Vestiture short, slightly rough over middle (largely obscured by labial palpi in male); scales moderately slender to piliform with bidentate to acute apices, generally longer and more slender laterally along eye margin; fuscous with white scale



Figs. 1-6. Adult morphology, *Acrolophus arboreus*. 1. Male, length of forewing 11 mm. 2. Female, length of forewing 12 mm. 3. Basal third of male antenna, ventral view (200  $\mu$ m). 4. Dorsal view of Figure 3 (150  $\mu$ m). 5. Sensilla coeloconica enlarged from Figure 4 (27  $\mu$ m). 6. Detail of single sensillum coeloconicum (5  $\mu$ m). (Scale lengths in parentheses; bar scale for all photographs = Fig. 3.)

bases in male, mostly white in female. Eye relatively large; interocular index ca. 1.1 mm; cornea with dense covering of interfaced setae, setae gradually becoming longer over posterior surface of eye; eyelash absent. Antenna short, less than 0.25 the length of forewing, 34–35 segmented; male with basal  $\frac{2}{3}$  strongly bipectinate (Figs. 3, 4); dorsal surface of rami densely covered with sensilla coeloconica (Figs. 5, 6), scape and pedicel fuscous irroriated with buff and dorsum of flagellum covered with dull white scales; female antenna simple with dorsum of basal  $\frac{2}{3}$  covered with scattered fuscous to brown scales, pedicel and scape white. Male with labial palpus elongate, curving over head to metanotum, fuscous laterally, pale buff to white mesally; labial palpus of female porrect, much shorter, ca.  $1.5 \times$  eye diameter, mostly light brown laterally, white mesally, with a prominent tuft projecting anteriorly from venter of second segment.

*Thorax:* Pronotum with dense mixture of short, moderately broad scales overlaid by elongate piliform scales, dull white irroriated with gray in male, mostly white irroriated with buff in female; venter densely covered with mostly white piliform scales. Forewing of male mostly light to medium fuscous with numerous fine, dark reticulate spots, a dark fuscous discal streak to base and a small rhomboidal anal spot; base of anal area distinctly lighter, mostly dull white; cilia brownish fuscous with a darker terminal line; forewing of female much lighter, light brown with darker brown reticulations and a much smaller, more slender brownish discal streak; subterminal area distinctly whiter. Hindwing uniformly fuscous in both sexes. Foreleg dark fuscous dorsally in male and dull white ventrally; light brown dorsally in female, white ventrally; epiphysis present, elongate, equal in length to foretibia. Midleg and hindleg progressively paler in both sexes; midtibia with dense brush of white piliform scales dorsally.

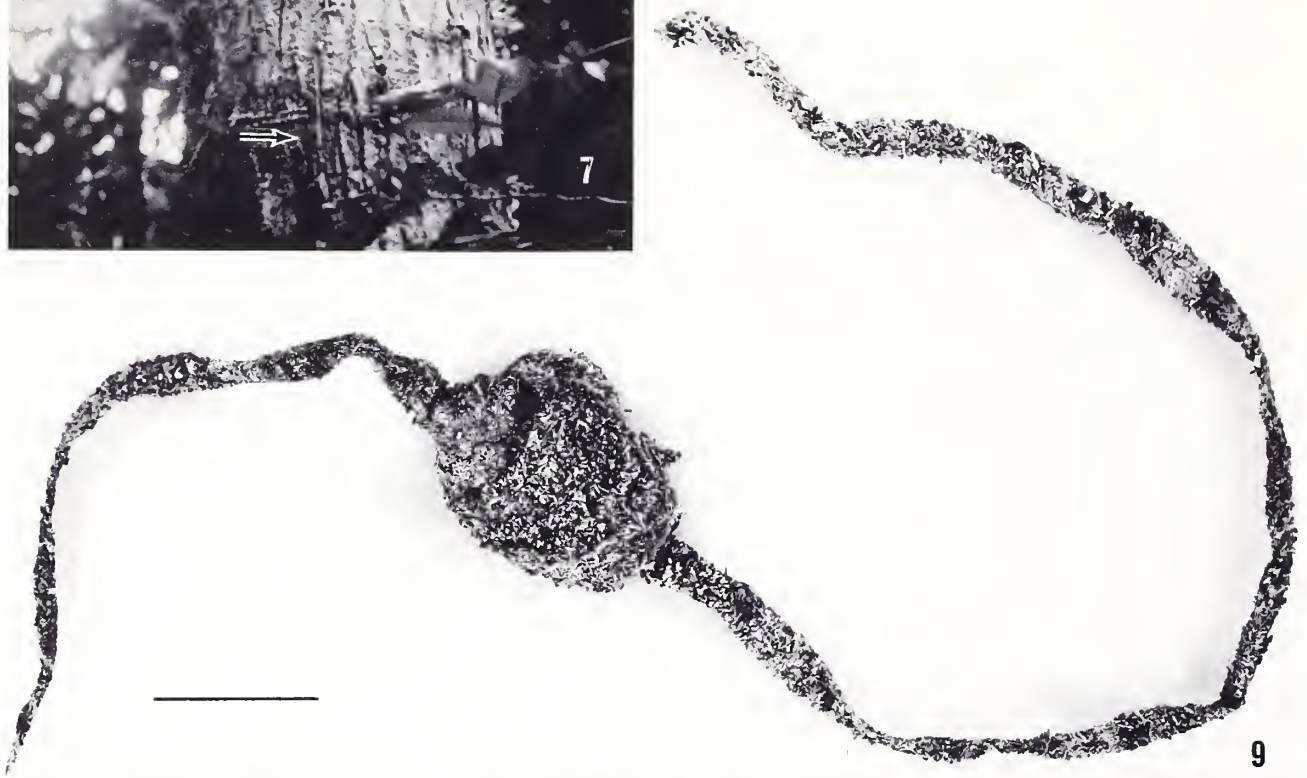
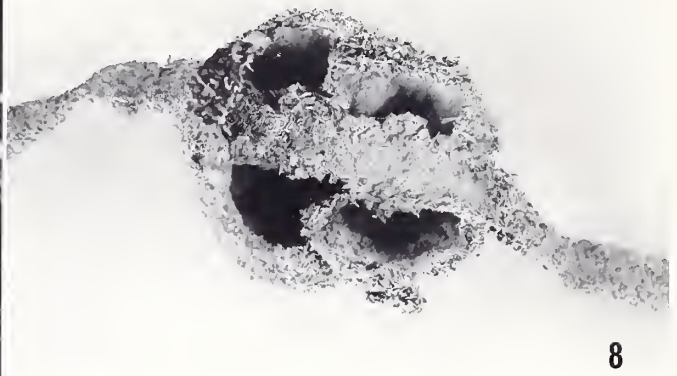
*Abdomen:* Almost entirely fuscous in male with caudal margins edged with white ventrally, especially over caudal three segments; generally paler in female, mostly light brown.

*Male genitalia:* As shown in Figures 35–38. Uncus moderately short, broad, and divided about half its length. Gnathos fused, mostly rounded with a slight, median cleft. Juxta absent. Valva broad, of complex outline, with a prominent, acute, apical lobe and an elongate, curved, acute saccular lobe closely associated with a membranous inner lobe from mesal membrane of valva. Aedoeagus elongate exceeding length of genital capsule, of complex form, with a broad median, uncinat cornutus and ca. 9 slender cornuti along apex of vesica.

*Female genitalia:* As shown in Figure 39. A single pair of short posterior apophyses present. Caudal margin of lamella antevaginalis irregularly serrate, well sclerotized. Ostium broad in diameter, width ca. equal to length of apophyses. Ductus bursae broad, short, sclerotized. Corpus bursae bilobed, relatively small, length only slightly exceeding that of ductus bursae; walls completely membranous.

LARVA (Figs. 10–34). Length of largest larva 32 mm; maximum diameter 3 mm. Body mostly gray dorsally over anterior half, lighter and predominantly cream to white over remainder of body; thoracic and anal plates and pinacula dark fuscous to gray.

*Head:* Dark reddish brown anteriorly, dark fuscous posteriorly. Maximum width 2 mm. AF2 arising at level of apex of frons. P2 more distant from P1 than P1 is to ecdysial line. Six pairs of stemmata present (Figs. 15, 28); 3–5 contiguous anteriorly



Figs. 7-10. Larval biology of *Acrolophus arboreus*. 7. Larval cases (see arrows) on tree trunk, Yanamono, Peru. 8. Underside view of chambered node of larval tube. 9. Larval tube, length ca. 35 cm (scale = 2 cm). 10. Larva, length ca. 30 mm.

between S1 and SS1; 6 reduced. Antennal sensilla as shown in Figures 29, 30, similar to that of *Acrolophus pholeter* Davis (1988) except segment 4 lacking apical extension. Labrum similar to *A. pholeter*. Mandible with 2 distinct cusps and two much reduced cusps; lateral (first) cusp elongate, acute (Fig. 18). Maxilla as shown in Figures 25–26; all sensilla basiconica (3 + 3 + 2) shorter than those of *A. pholeter*; A2 styloconic; sensillum digitiformium (SD) greatly reduced, subapical. Spinneret and labial palpus (Figs. 20, 24) similar to *A. pholeter*. Apex of mentum with a pair of minute secondary setae (Fig. 22).

*Thorax*: Pronotal and mesonotal plates dark reddish brown to nearly black. Spiracular plate almost completely separated from pronotal plate by a narrow fissure; all 3 lateral setae together on spiracular plate. Coxal plates narrowly separated (Fig. 31). Tarsal claw (Fig. 32) with minute, slender axillary seta.

*Abdomen*: A1–6 with 11 pairs of primary setae, SV trisetose. A7–8 with SV3 absent. A9 with 9 setal pairs, SV unisetose. Ventral crochets in a uniserial ellipse of approximately 50–53 hooks; anterior and posterior sides of prolegs densely covered with small scattered spines, more numerous anteriorly. Anal proleg with ca. 28 hooks in a half ellipse open posteriorly and covered with dense spines anteriorly. A8 with spiracle greatly enlarged, equalling size of prothoracic spiracle. Anal plate with 4 pairs of elongate setae.

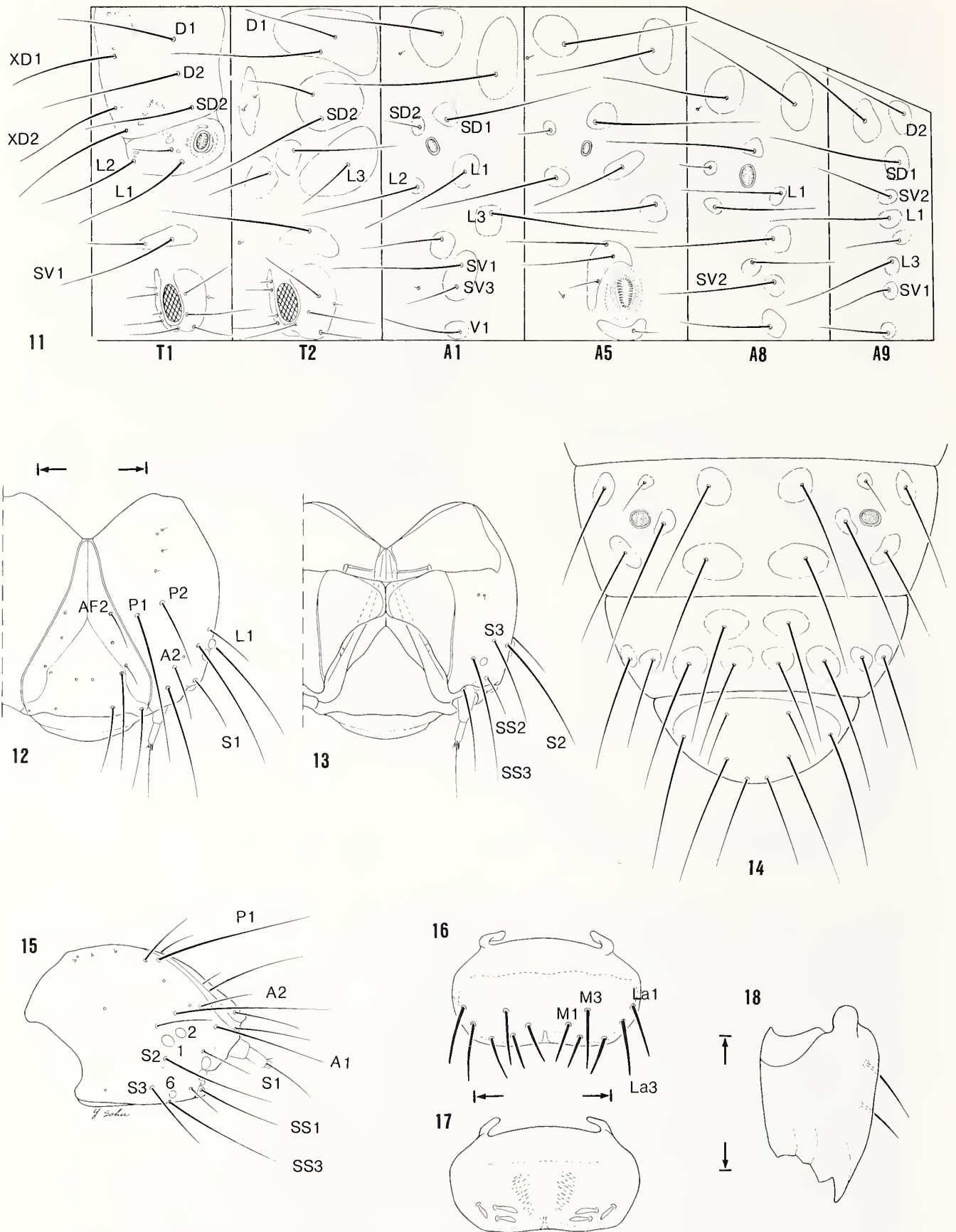
**LARVAL CASE** (Figs. 7–9). An elongate tube up to 35 cm in length and 5 mm in diameter, constructed of minute wood fragments held together by silk; a 3 to 6 chambered, oval, abruptly enlarged dome-like section variably situated somewhere along midlength of tube, up to 40 mm long, 30 mm wide and 15 mm high. Inner surfaces of larval tube and chamber smoothly lined with thin layer of whitish silk; cavity devoid of frass or debris. Larval tube extends through chamber intact, without any openings; partitions of central chamber possibly due to successive enlargement of chamber. Color light to dark brown.

**PUPA** (Figs. 40–48). Length of largest pupa: ♀, 12 mm; ♂, 12.8 mm. Dark reddish brown in color. Vertex smooth except for a pair of small setae near middorsal line. Frons with a small pair of setae near inner margin of eye (Figs. 40, 41, 44). Antenna of male relatively longer and much broader than in female; labial palpus ca. twice as long in male than female. Wings extend to middle of A3. Mesonotum with two pairs of dorsal setae, D1 more anterior and separated further apart than D2. Dorsum of A3–8 with a low, transverse, minutely and densely spined (Figs. 45, 46) ridge parallel to anterior margin. A10 a relatively small, acutely furcate cremaster dorsally (Figs. 47, 48).

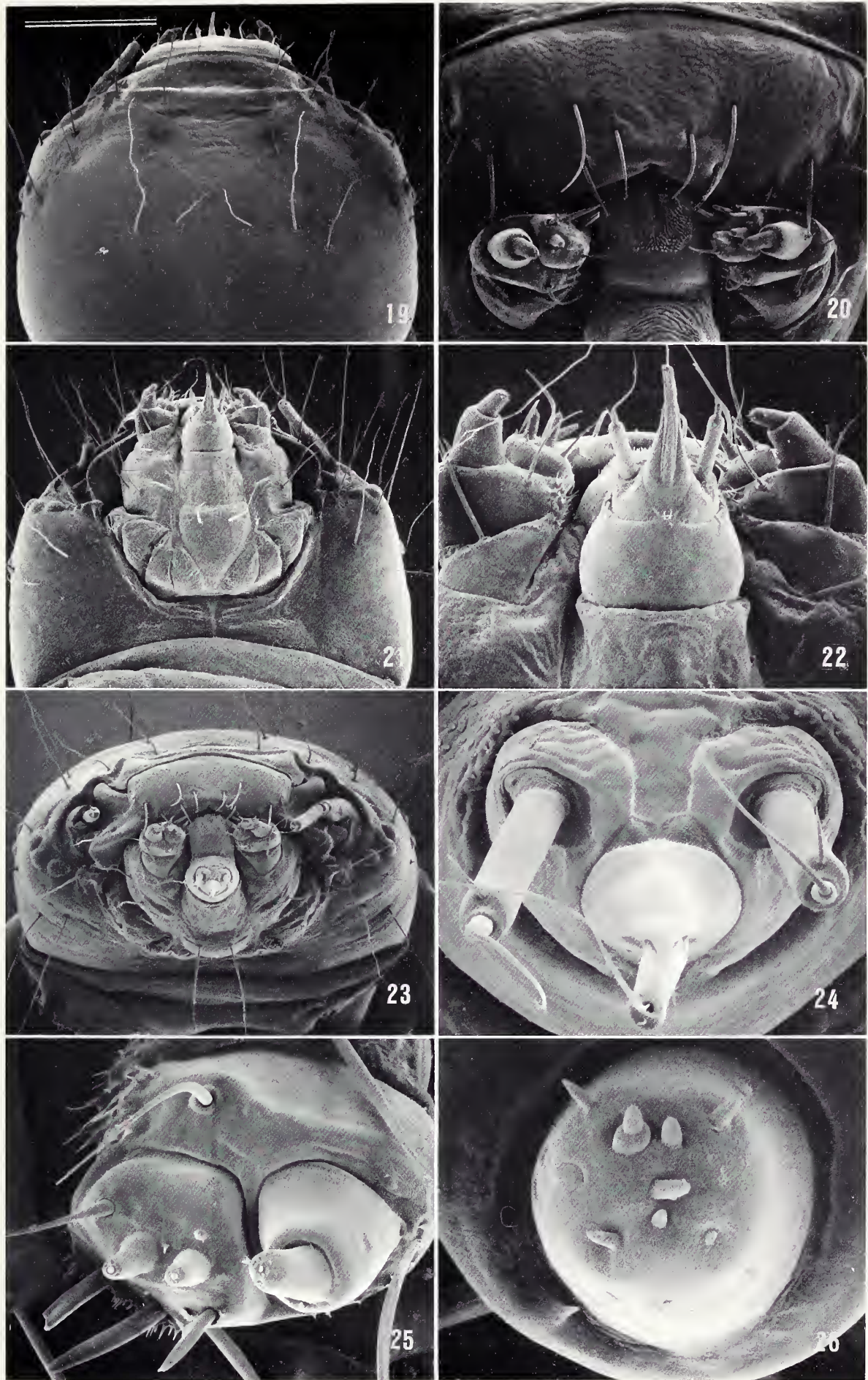
**HOLOTYPE**. ♂, Yanamono, 80 km east of Iquitos, Loreto Department, Peru; 3 Jul 1990, emerged 28 Jul 1990, C. L. Hogue (LACM).

**PARATYPES**. PERU. Loreto Department: Amazon Safari Camp, Río Momon, near Iquitos: 1 ♀, 25 Jun 1980, emerged 12 Aug 1980, C. Hogue, CLH 268.1, genitalia slide 3669 (LACM); 1 ♂ pupa, 25 Jun 1980 (LACM). Yanamono, 80 km E Iquitos: 1 ♂, emerged Jul 1982, C. Hogue (LACM); 1 ♂, emerged 20 Jul 1983, pupal slide 3653–54 (LACM); 1 ♂, emerged 23 Jul 1983, C. Hogue (LACM); 1 ♂, emerged 23 Jul 1983, antenna slide 28638 (USNM); 1 ♂, emerged 28 Jul 1983, genitalia slide 30926, C. Hogue (USNM). Same data as holotype, 1 ♂ (LACM); 20 larvae, 3 Jul 1990, C. Hogue slides 30696–98 (USNM, LACM).

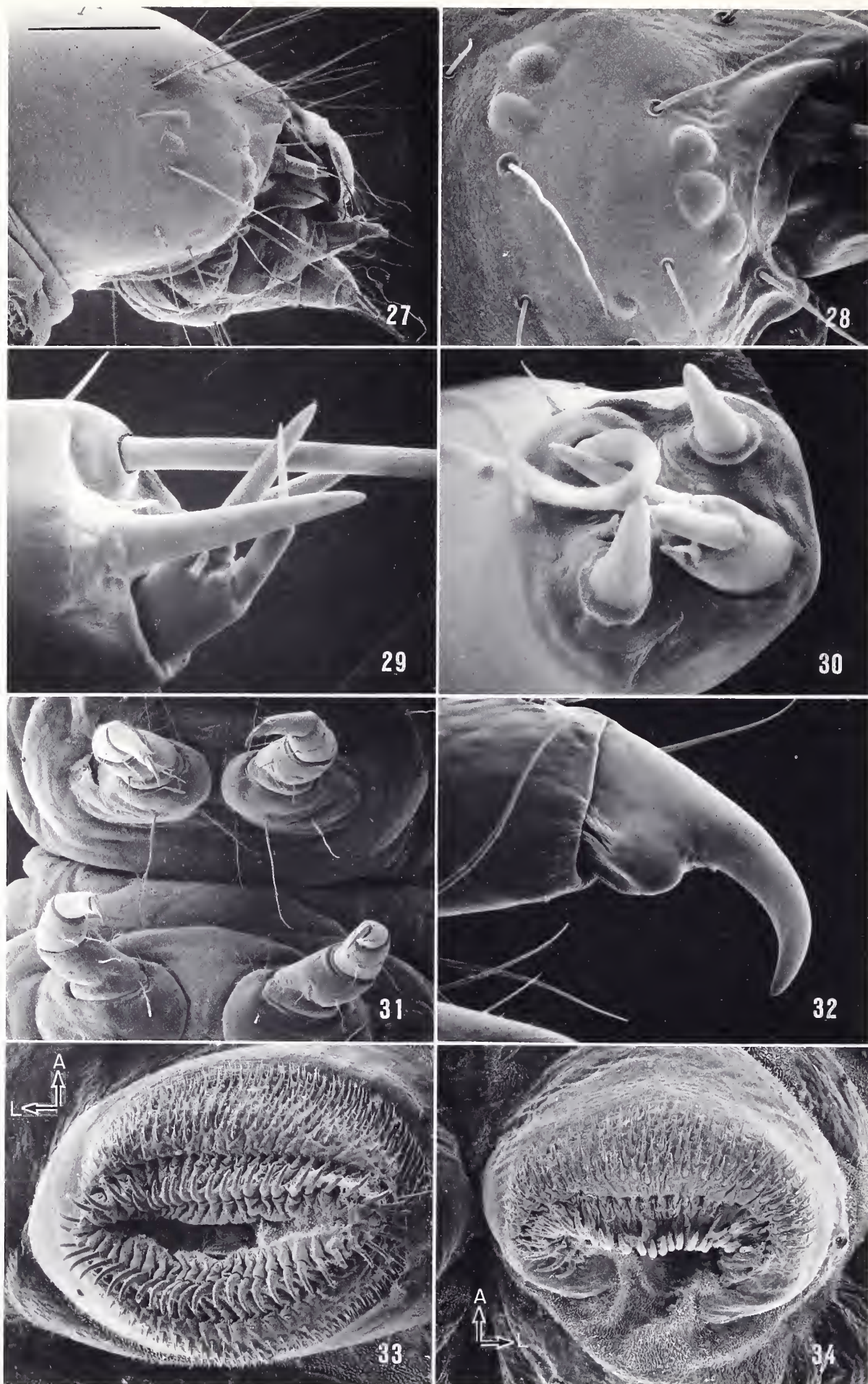
**HOST**. Unknown; most probably various lichens and other plant debris on the



Figs. 11-18. *Acrolophus arboreus*, larval morphology. 11. Chaetotaxy of pro- and mesothorax, abdominal segments, 1, 5, 8, 9. 12. Head, dorsal view (0.5 mm). 13. Head, ventral view. 14. Abdominal segments 8-10, dorsal. 15. Head, lateral view. 16. Labrum, dorsal (0.5 mm). 17. Labrum, ventral. 18. Mandible (0.5 mm). (Scale lengths in parentheses.)

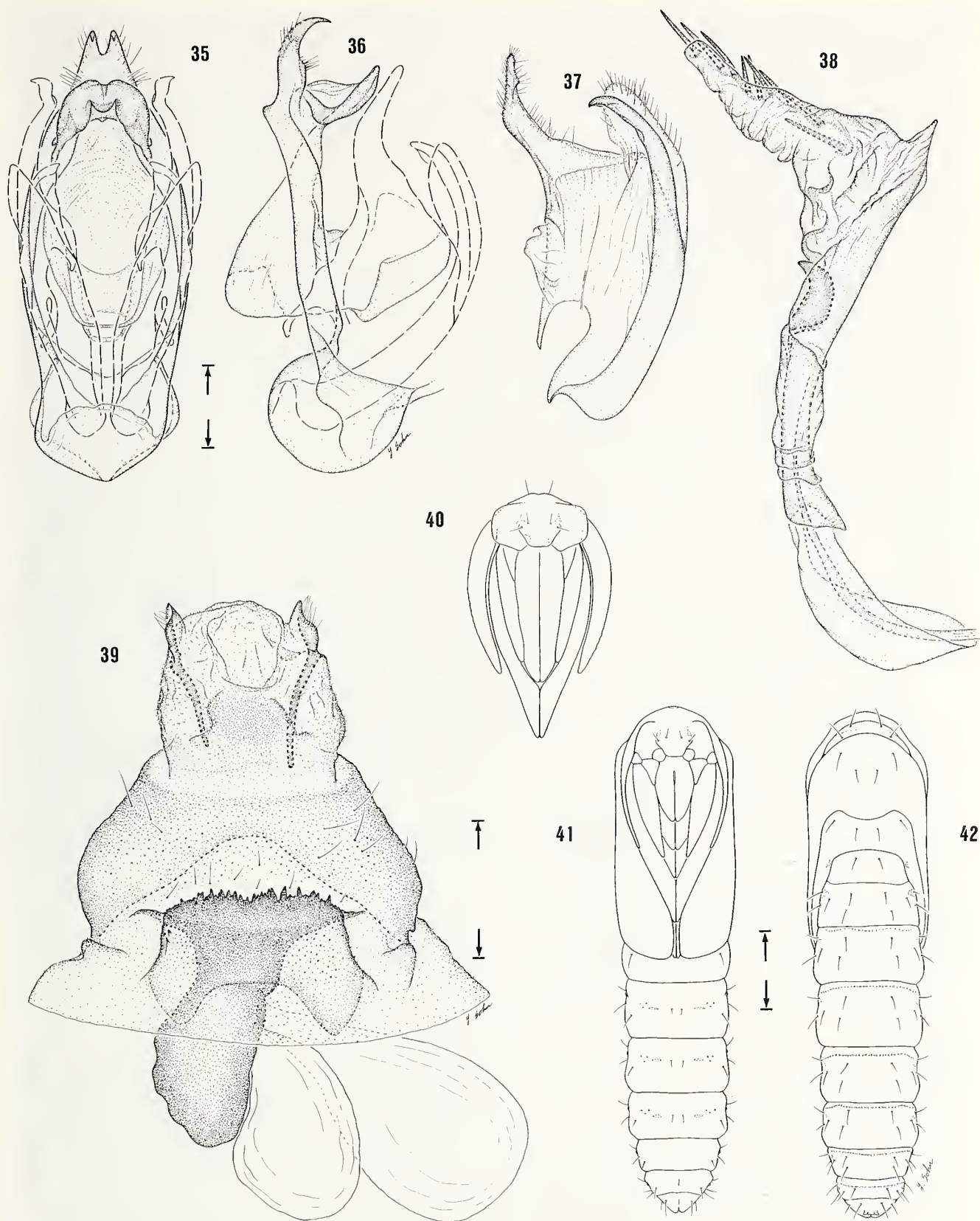


Figs. 19–26. *Acrolophus arboreus*, larval morphology. 19. Head, dorsal view (0.6 mm). 20. Labrum and maxilla (231  $\mu\text{m}$ ). 21. Head, ventral view (0.6 mm). 22. Labium and maxilla, ventral view (200  $\mu\text{m}$ ). 23. Head, anterior view (0.6 mm). 24. Labial palpi and spinneret (60  $\mu\text{m}$ ). 25. Maxilla (75  $\mu\text{m}$ ). 26. Sensilla of maxillary palpus (15  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for all photographs = Fig. 19.)

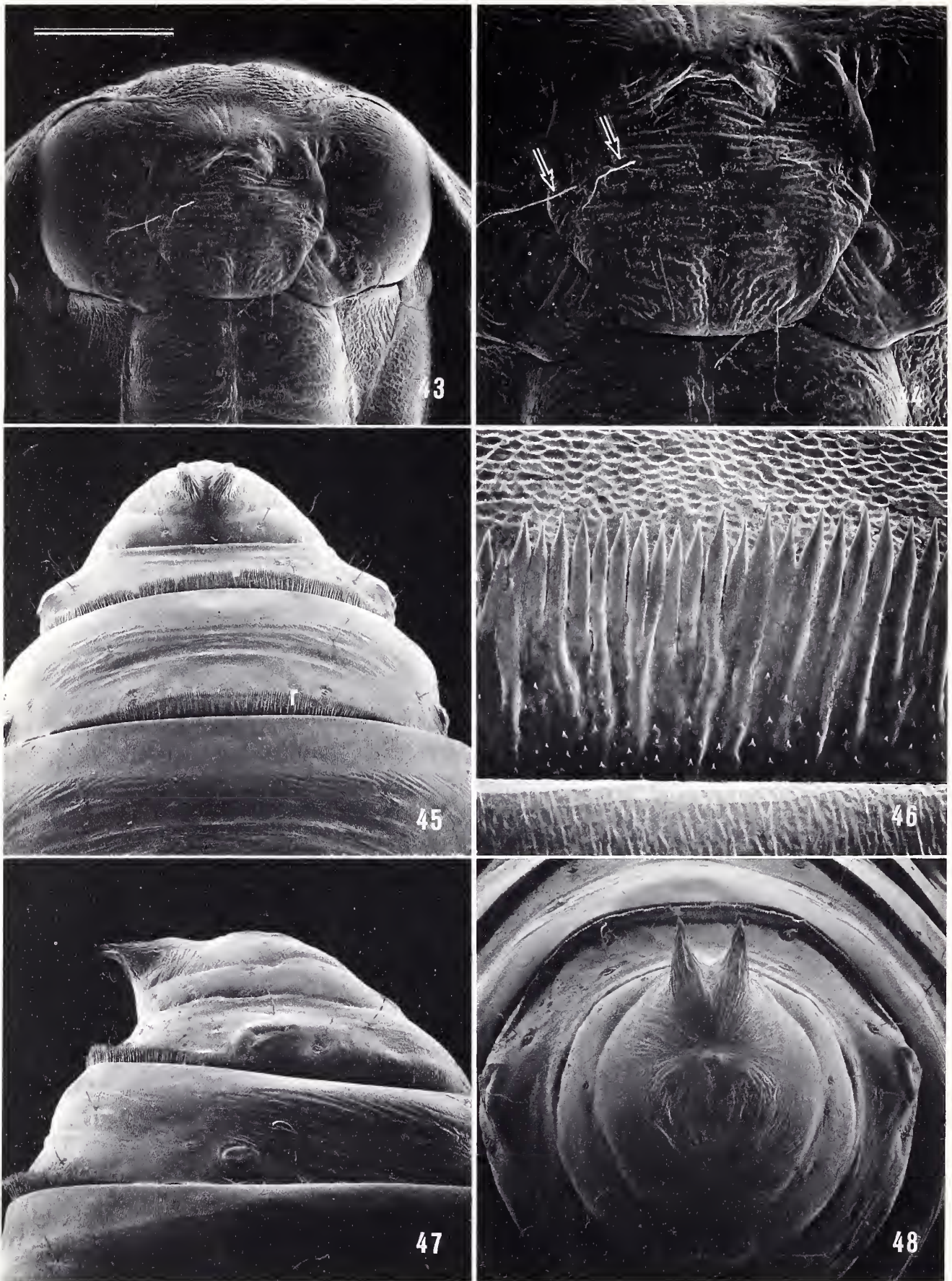


Figs. 27–34. *Acrolophus arboreus*, larval morphology. 27. Head, lateral view (0.5 mm). 28. Stemmatal area (231  $\mu\text{m}$ ). 29. Antenna, lateral view (23.1  $\mu\text{m}$ ). 30. Antenna, distal view (23.1  $\mu\text{m}$ ). 31. Thorax, ventral view of T1 and 2 (0.67 mm). 32. Pretarsus, lateral view of T1 (50  $\mu\text{m}$ ). 33. Abdominal proleg, A3 (150  $\mu\text{m}$ , A = anterior, L = lateral). 34. Anal proleg (150  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for all photographs = Fig. 27.)





Figs. 35–42. *Acrolophus arboreus*, genital morphology and pupae. 35. Male genitalia, ventral view (0.5 mm). 36. Lateral view. 37. Valva, mesal view. 38. Aedoeagus. 39. Female genitalia, ventral view (0.5 mm). 40. Male pupa, head. 41. Female pupae, ventral view (0.5 mm). 42. Dorsal view of Figure 41. (Scale lengths in parentheses.)



Figs. 43–48. *Acrolophus arboreus*, pupal morphology. 43. Head, ventral view (0.6 mm). 44. Frons, with paired setae (see arrows) (0.33 mm). 45. Dorsal view of A6–10 (0.6 mm). 46. Detail of serrated dorsal ridge of A7 (see r in Fig. 45) (60  $\mu$ m). 47. Lateral view of A6–10 (0.6 mm). 48. Caudal view of A10 (0.6 mm). (Scale lengths in parentheses; bar scale for all photographs = Fig. 43.)

bark of several trees including *Chimarrhis glabriflora* Ducke (Rubiaceae) and *Ficus insipida* Willd. (Moraceae).

**FLIGHT PERIOD.** June–August. Because collecting was conducted only during this period, which occurs in the middle of the dry season, the maximum flight period and seasonality of this species are uncertain.

**DISTRIBUTION.** Adults known only from type locality, an area in the Peruvian Amazon in the vicinity of Explorama Lodge (=Yanamono), ca. 80 km E Iquitos, Department of Loreto. Perhaps widely distributed in the Amazon Basin as indicated by larval cases observed in Manaus, Brazil (see ethnological note).

**ETYMOLOGY.** The specific name is derived from the Latin *arboreus* (of trees) in reference to the unusual, arboreal habit of the larva.

**TAXONOMIC DISCUSSION.** Currently, *Acrolophus arboreus* does not appear closely related to any described species in this large genus. The unusual structure of the male genitalia, particularly the rather complex form of the valva and thickened gnathos, show no close affinities to a similarly arboreal and undescribed *Acrolophus* from Costa Rica.

Larval chaetotaxy appears to be very conservative within *Acrolophus*. Possibly the reduced sixth stemma is the most diagnostic larval character for this species. Among the few known larval cases, the swollen, centrally located chamber is unique. The similar case observed in Manaus, Brazil (see ethnological note) probably represents this species.

**BIOLOGICAL OBSERVATIONS.** Larval tubes have been observed on the trunks of several tree species, including two identified by A. Gentry (pers. comm., letter of 31 Aug. 1982 to Hogue) as *Chimarrhis glabriflora* Ducke and *Ficus insipida* Willd. The tubes are located from 3 to 7 m above the ground and normally oriented vertically. They are easy to see, usually being of slightly different color than the tree bark. The tubes are weakly attached to the bark surface along their entire length but adhere more tightly at the upper end, their apparent origin.

The function of the chambered, swollen node located along the middle of the larval tube was not observed. Possibly the larva uses this as a retreat even though no openings in the tube were observed within the cup-like chamber. An outer shell around the tube might provide some added protection. Likewise, larval feeding was not observed. Possibly the larva gleans lichens or other plant material from either end of the tube.

**ETHNOLOGICAL NOTE.** During a visit to the Municipal Market in Manaus, Brazil, on 25 April 1990, Hogue noticed the larval tubes of *A. arboreus* (or a very close relative) in a stall where basketry and sundries were sold. Hogue was told by the vendor that the tubes were called (in Portuguese) “rede de tamaquaré,” meaning “net of the tamaquaré lizard.” He believed that this lizard, which is frequently found climbing on tree trunks in the nearby forest, was responsible for making the tubes.

The tubes were described by the vendor as useful in “black magic,” to influence the humor of one’s spouse or sweetheart, as follows: “Colocar o nome dentro da rede, e colocar embaixo do travesseiro.” Put the name [of one’s lover, on a piece of paper] inside the net and place it under [her] pillow. In the morning she will wake up in a perfectly friendly mood.

The common name “tamaquaré” (syn. “taquaré”) in Brazil applies to *Enyalia* spp. (von Ihering 1968:675). A poorly preserved specimen of the alleged net maker shown

to Hogue by the vendor appeared not to be of this genus but the very common, often arboreal, *Tropidurus torquatus* Van Lidth de Jeude, 1917, known in Brazil as "ta-raquirá." In any case, identification of the lizard is unimportant to the story, the locals being imprecise taxonomists.

#### ACKNOWLEDGMENTS

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The senior author (Davis) is responsible for the systematic and morphological portions of this paper and the biological and ethnological observations are by the junior author (Hogue) who discovered the species. This report constitutes contribution XXV in the Smithsonian Neotropical Microlepidoptera series.

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